SECRET

COR-1661
Copy 1 of 5

28 May 1962

MEMORANDUM FOR: Finance Officer, DPD

THROUGH : CH/DB/DPD

NRO
25X1

SUBJECT : Contract [redacted] CORONA
Invention Disclosures

1. Attached hereto is Contractor's Invention and Royalty Reports for subject contract.

25X1A

2. Attention is invited to the three (3) Disclosures of Invention numbered D-03-1566, D-03-1567 and D-03-1568. Contractor has stated in [redacted]4013 that they do not intend to file for patents at this time nor in their opinion do these inventions involve any security problem.

3. The Contracting Officer and the Chief, Development Branch, concur in Contractor's statement regarding security classification; further, the Chief, Development Branch, is of the opinion that the Government should not file for patents on its own behalf. In the event the Contractor does file and is granted a patent, the Government will receive a free license right.

4. In view of the foregoing, Finance, DPD, is requested to consider the attachment as meeting the reporting requirements under the contract and make payments of amounts withheld for reasons thereof.

25X1A

[redacted]
Chief, Contracts Staff, DPD

CONCURRENCE:

25X1A

[redacted]
JOHN PARANGOSKY
Chief, Development Branch, DPD

CS/DPD-DD/R:cc
Distribution:
Cy 1 - FIN/DPD w/att.
2 - CH/DB/DPD w/att.
3 - CS/DPD [redacted] W/ATT.
4 - RI/DPD
5 - CS Chrono

NRO
25X1

SECRET

DPD-2833-62

COPY 1 OF 1

In reply refer to:
SP2-166

24 April 1962

Jim

Dear Wendell:

Pursuant to the invention and royalty reporting requirements of our various contracts, we are pleased to enclose two copies of three Disclosures of Invention numbered D-03-1566, D-03-1567 and D-03-1568 covering Subject Inventions which have been generated in the course of the performance of research and development work under Contract

25X1A
25X1
NRO

To the best of our knowledge and belief there have been no royalties paid directly to others in the performance of the cited contract.

There have been no subcontracts issued under the cited contract which required the inclusion of a Patent Rights Clause with the following exceptions, each of which has reported that it has no subject inventions:

25X1A

Subcontract 100-7 dated 24 October 1958
Subcontract 22-1615 dated 1 December 1958

25X1A

Subcontract No. 100-8 dated 2 January 1959

Itek Corporation, Boston, Massachusetts
Subcontract No. 100-9 dated 30 December 1958

The enclosed Disclosures of Invention constitute the entire reportable Subject Inventions under the cited contract, and this letter should be considered the final Invention, Royalty and Subcontract Report under the cited contract.

This report is submitted partially in response to DPD-1854-60 and if this report is acceptable to you, would you be kind enough to release the funds impounded by the action cited in that letter.

Very truly yours,

25X1A

FINANCE

D-03-1566

14 00099139D

RNA

DISCLOSURE OF INVENTION

PATENT DEPARTMENT

LOCKHEED AIRCRAFT CORPORATION
MISSILES and SPACE DIVISION

This disclosure of invention form sheet is for the purpose of securing a disclosure and record date of invention and it is important that it be made out and filed with the Patent Department as soon as possible after conception of the invention in order that priority rights to the invention may be secured. A separate sheet may be used for each invention or modification of the invention and each sheet should be signed and dated by the inventor and also signed and dated by witnesses, preferably two, by whom the contents of the disclosure have been read and understood.

IN THE SPACE BELOW, give a clear and concise explanation of the invention. If it is purely a process give a complete description of it including flow diagrams; if it is a method capable of being illustrated by a sketch or where it is an apparatus, circuit or mechanical device, the disclosure should consist of a sketch with the parts numbered with a description of the sketch and method of operation making reference to the numbered parts. If possible a specific illustrative example and operative description of the invention should be included.

If the space below is inadequate, attach separate drawings or prints and description, properly signed, witnessed and dated.

All of the following entries should be made preferably in ink or type.

1. TITLE OF INVENTION FAIRING COOLING JACKET

2. SKETCH AND DESCRIPTION OF INVENTION

(Also list and identify herein all attached drawings and descriptions)

1. COOLING JACKET TEST REPORT & SKETCH (5 SHEETS)

2 FLIGHT ARTICLE DRWG. T2-429 (1 SHEET)

FORM LMSC 878-2

(over)

3. PURPOSE of the invention - A LIGHT WEIGHT COMPACT COOLING UNIT TO COOL & DISSIPATE EXIT HEATING OF THE FAIRING.

4. PREVIOUS METHOD or apparatus THERMAL COATINGS & ABLATIVE COATINGS

5. INFORMATION on previous method or apparatus; known use, publication or patents ONE WOULD BE "THERMO-LAG" T230 EXCEL

6. HOW does this invention differ from previous method or apparatus and what advantages does it offer?
THE INVENTION WEIGHS 3% OF PREVIOUS METHODS.
THE INVENTION IS 100% OR TWICE MORE EFFECIENT.
THE INVENTION IS EXTREEMLY SMALL IN COMPARISON.

7. DATE OF CONCEPTION (when you first thought of the idea) 1-26, 19 59

8. (a) First sketch or drawing made on 1-26, 19 59
Where filed

(b) First written description made on 1-26, 19 59
Where filed

25X1A NOTE: Where possible the above sketches, drawings and descriptions should be attached to this sheet.

9. INVENTION was first disclosed to:
(1) [redacted] Date 1-27, 19 59, How SKETCH
(2) [redacted] Date 1-27, 19 59, How SKETCH

10. FIRST APPARATUS (a) started on 4-4, 19 59 (b) completed on 4-11, 19 59

11. FIRST OPERATION of apparatus or process (a) started 4-11, 19 61 (b) completed 4-11, 19 61

25X1A (c) Observed by [redacted] and [redacted]

25X1A (d) Apparatus or result of process located at

12. OTHER ACTS tending to prove conception, such as preparation of calculations, preparation of shop order for model, etc., giving dates and state where such data is filed:
SHOP DRWGS.
TEST REPORTS
25X1A

SHOWN and DESCRIBED to me/us on this 16 day of JAN, 1962

[redacted]

WITNESSES' SIGNATURES

25X1A

13. I (we) hereby certify that, to the best of my (our) knowledge, I am (we are) the first and original inventor(s) of the subject matter hereinbefore described.

this 29 day of AUG., 19 61

[redacted]

NAME (Plea[redacted]
Home Addre[redacted]
Orgn. 62-[redacted]
Division Name

Employee No.

Inventor's Signature

NAME (Please Print)
Home Address
Orgn. Bldg. Phone Extension
Division Name

1566

Approved

COOLING JACKET TEST REPORT

PROBLEM

The estimated uncooled ring temperature at station 274.40 of 750° F will cause expansion of this ring beyond the protecting tip of the re-entry body and thereby induce failure of the front ring.

To prevent this we have designed and tested a compact cooling unit to reduce this ring temperature to 200° F - 300° F.

DESIGN

The design (see Figure 1) consists of forming a water jacket in the ring by closing the open side with a bonded in fibre glass wall, packing enclosure with an absorbent material that will hold a maximum amount of water, but will readily release steam upon heating.

Restricted escape holes vented to the outside are plugged with a fusible material designed to melt at a specific temperature.

A close weave fibre glass wool baffle across inside of escape holes acts as a water trap and increases efficiency.

The operating principle is as skin temperature rises heat is conducted to the ring and causes the water held in the absorbent packing to boil, the fusible plugs melt allowing the steam to escape to the outside, removing the heat. Steam pressure is maintained by the sized restricting escape holes.

TEST SPECIMEN

Test specimen construction (see Figure 1) duplicates a 10" section of ring and skin in cross sectional area.

The skin was .10" thick x 10" long x 8" high magnesium thorium sheet. The ring was cut from magnesium thorium to duplicate the cross sectional area of actual flight ring.

The jackets were fibre glass formed over a mahogony mold and held in place by high temperature rubber and cured in an oven.

The specimens were then packed with absorbent material and the jacket bonded in place with aero bond p. e. and cured for 30 minutes at 250° F.

After cure, the specimen was filled with water by syringe thru escape holes and sealed. A pressure gage was then attached to a few optimum samples (see figure 1). The specimen was then thermocoupled (see Figure 1) and aquadagged on skin.

TEST EQUIPMENT

Temperature was recorded with a visi-corder using chromel-alumel thermocouples, calibrated in an 0° to 500° F oven and extrapolated for higher temperatures. Ice was used as reference junction.

Heat source was a bank of 8 G. E. radiant heat quartz lamps, with a polished aluminum reflector mounted behind.

TEST PROCEDURE

The specimens were weighed before and after jacket installation to determine jacket weight, and after water installation to determine water weight.

The specimens were then placed 2.5 inches from heat lamps. This distance was determined by testing a calibration magnesium sheet .1 x 8 x 10 with a thermocouple installed on the center of the side away from lamps and within .03 inches of heated side. All skin thermocouples were installed in this manner.

The specimen was then painted with a thin layer of aquadag and distance tested for 950° F in 100 seconds. (See Figure 2 Temperature vs Time Curve)

A second calibration specimen with skin and ring but no packing or water jacket was tested for comparison purposes (See Figure 3).

All jacketed specimens were then tested, all had a thermocouple installed in skin as well as the ring to determine heat sink characteristics and constant lamp output. For locations, see Figure 1.

CONCLUSIONS

The results of 35 tests are as follows:

Average ring temperature at 100 seconds was 240° F (See Figure 4)

Average weight summary:

Specimen	Flight Article
Water - 21 grams	.46 pounds
Jacket - 8 grams	.18 pounds
Total - 29 grams	.64 pounds

Average steam pressure 6 P.S.I. starting to build up at 60 seconds

The optimum steam escape area was found to be three .025" holes.

Optimum packing material is Serena (a powdered paper used in sanitary napkins). This material held a maximum amount of water and most readily released it in steam.

Optimum jacket material is epoxy impregnated fibre glass for its flexibility.

Optimum baffle material is dence fibre glass wool.

Optimum plug material is sealing wax due to its melting point.

The following materials were also tested in search of the optimum:

Packing

cotton wool
glass wool
sponge
sanitary napkins of various brands
no packing

Baffles

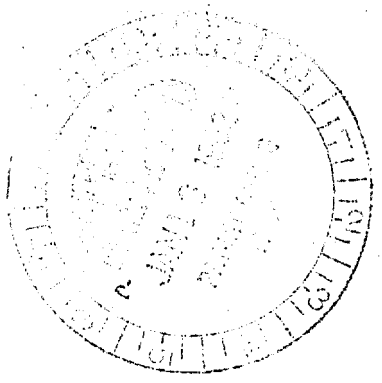
glass wool
porous bronze
no baffle

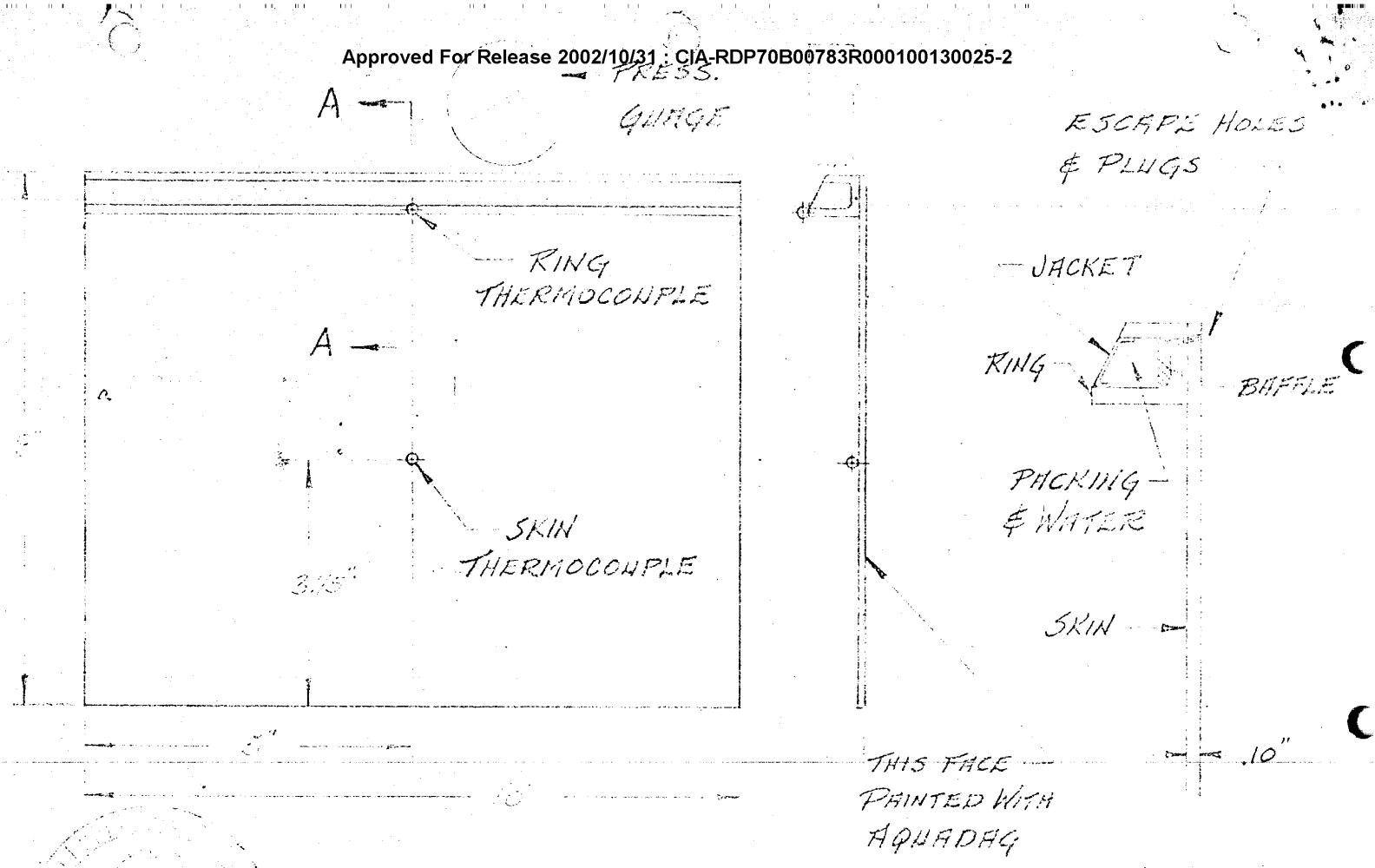
Plugs

solder of different melting points
paraffin wax
candle wax
no drip candle wax
no plugs

Jackets

phonolic impregnated fibre glass
P. E. impregnated fibre glass
P. E. directly on packing





SECTION A-A

COOLING JACKET TEST SPECIMEN

FIG. 1

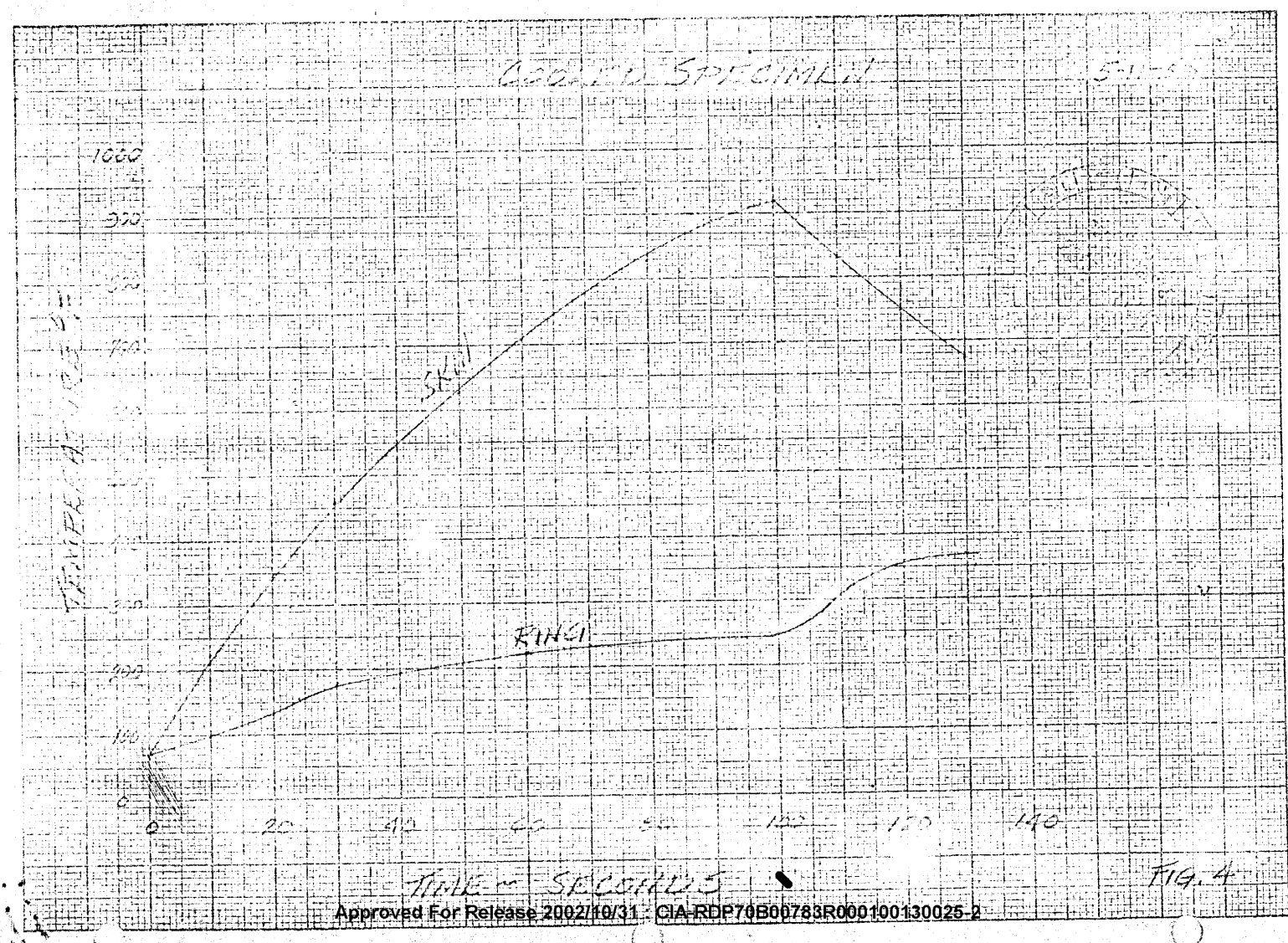
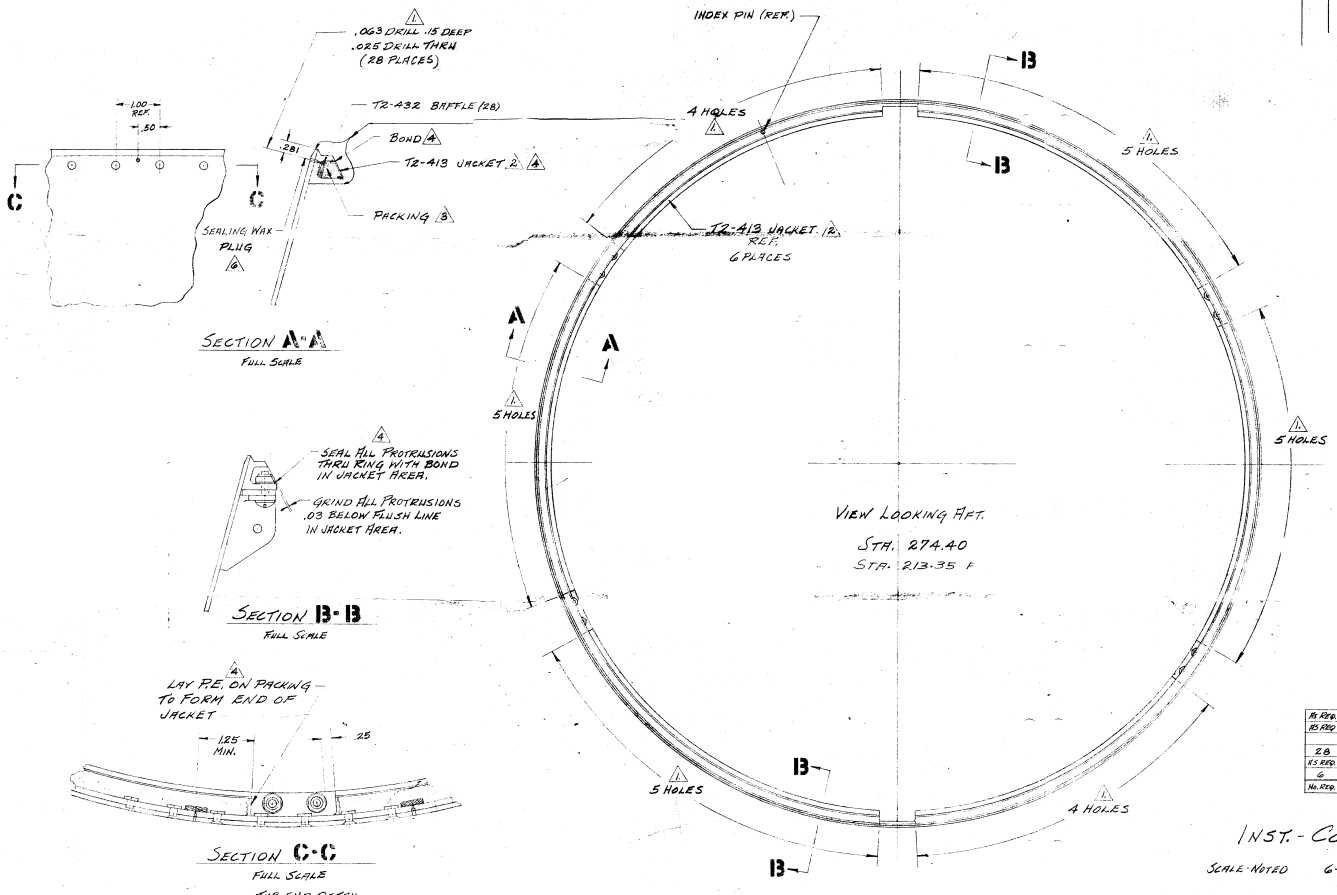


FIG. 4



No. Req.	Sealing Wax	PLUG	6
AS REQ	R.E.	BOND	4
28	T2-432	BAFFLE	
AS REQ	T2-431	TOOL	4
6	T2-413	JACKET	2
No. Req.	PART NO.	TITLE	

INST. - COOLING JACKET

SCALE-NOTED 6-19-59 F.W.

T2-429 A

CANCELLED 12-19-60 F.W.
SEE E.O. 115493

D-03-1568 RNA

14 00099141D

DISCLOSURE OF INVENTION

PATENT DEPARTMENT

LOCKHEED AIRCRAFT CORPORATION
MISSILES and SPACE DIVISION

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IN THE SPACE BELOW, give a clear and concise explanation of the invention. If it is purely a process give a complete description of it including flow diagrams; if it is a method capable of being illustrated by a sketch or where it is an apparatus, circuit or mechanical device, the disclosure should consist of a sketch with the parts numbered with a description of the sketch and method of operation making reference to the numbered parts. If possible a specific illustrative example and operative description of the invention should be included.

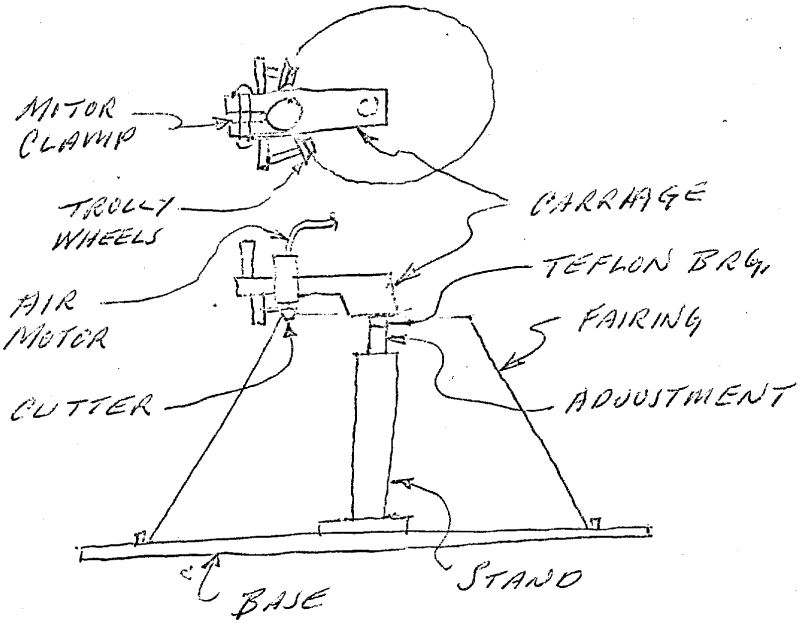
If the space below is inadequate, attach separate drawings or prints and description, properly signed, witnessed and dated.

All of the following entries should be made preferably in ink or type.

1. TITLE OF INVENTION PRECISION FAIRING MACHINING TOOL

2. SKETCH AND DESCRIPTION OF INVENTION

(Also list and identify herein all attached drawings and descriptions)



THE CUTTER IS GUIDED BY THE TROLLY WHEELS WHICH FOLLOW THE FAIRING CONTOUR & MAINTAINS A CONSTANT WALL THICKNESS.

THE CARRIAGE RIDES ON A TEFLON BEARING, ALLOWING IT TO MOVE IN ALL DIRECTIONS IN A PLAIN, THIS MAINTAINS THE ANGLE ON THE TOOL, BUT ALLOWS THE TOOL TO FOLLOW THE TROLLY WHEELS.

(over)

FORM LMSD 873-2

3. PURPOSE of the invention TO MACHINE THE FAIRING TAINT END TO PERFECT FIT TO THE FOREBODY & MAINTAIN AN EQUALL WALL THICKNESS ON THE FAIRING EVEN THOUGH IT IS NOT ROUND, & TO MAINTAIN THE MACHINED ANGLE.

4. PREVIOUS METHOD or apparatus NONE

5. INFORMATION on previous method or apparatus; known use, publication or patents NONE

6. HOW does this invention differ from previous method or apparatus and what advantages does it offer?

7. DATE OF CONCEPTION (when you first thought of the idea) 12-3, 19 58

8. (a) First sketch or drawing made on 12-3, 19 58
   Where filed
   (b) First written description made on 12-3, 19 58
   Where filed
   NOTE: Where possible the above sketches, drawings and descriptions should be attached to this sheet.

25X1A

9. INVENTION was first disclosed to:
   (1) [redacted] Date 12-3, 19 58, How SKETCH
   (2) Date , 19 , How

10. FIRST APPARATUS (a) started on 12-9, 1958 (b) completed on 12-22, 19 58

25X1A

11. FIRST OPERATION of apparatus or process (a) started 12-22, 19 58 (b) completed 12-22, 19 58
    (c) Observed by [redacted] and
    (d) Apparatus or result of process located at Bldg 104

12. OTHER ACTS tending to prove conception, such as preparation of calculations, preparation of shop order for model, etc., giving dates and state where such data is filed:

25X1A

SHOP DRWGS
TEST REPORTS

13. I (we) hereby certify that, to the best of my (our) knowledge, I am (we are) the first and original inventor(s) of the subject matter hereinbefore described.

this 25 day of AUG, 19 61

[redacted]

NAME (Please P
Home Address
Orgn. 62-28 Bldg. 104 Phone Extension 28883
Division Name
Employee No.

Inventor's Signature

25X1A

SHOWN and DESCRIBED to me/us on this 16 day of JAN, 1962

[redacted]

WITNESSES' SIGNATURES

NAME (Please Print)
Home Address
Orgn. Bldg. Phone Extension
Division Name